

# **A Guide to Inspecting and Maintaining Structural Stormwater Best Management Practices**

for Homeowners Associations and Property Owners



**Types of BMPs ■ Signs of a Degraded BMP ■ Who Should Carry Out Maintenance**

**Inspecting Your BMP ■ BMP Inspection Schedule ■ Maintenance Costs**

**Putting Together Your Own Maintenance Plan**

**2014**



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**A Guide to  
Inspecting and Maintaining  
Structural Stormwater Best Management Practices  
(BMPs)  
for Homeowners Associations and Property Owners**

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This document is based on a similar document produced by Lake County Stormwater Management Commission.  
The original document is available to download from:  
[http://www.lakecountyil.gov/Stormwater/Publications/BMPs/A%20Citizen's%20Guide%20to%20Maintaining%20Stormwater%20Best%20Management%20Practices%20\(Lake%20County%20Stormwater%20Management%20Commission%202004\).pdf](http://www.lakecountyil.gov/Stormwater/Publications/BMPs/A%20Citizen's%20Guide%20to%20Maintaining%20Stormwater%20Best%20Management%20Practices%20(Lake%20County%20Stormwater%20Management%20Commission%202004).pdf)

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## Do You Have a Stormwater BMP?

The term "Best Management Practices," or BMP, was introduced and defined by the U.S. Environmental Protection Agency as a practice or physical structure that is an effective, practicable means of preventing or reducing the amount of pollution generated by stormwater runoff.

As development occurs, land is covered by roads, driveways, rooftops and other hard surfaces that do not allow stormwater to infiltrate (or soak) into the ground. Without structural BMPs, the end result of development may be flooding, poor water quality, and stream bank erosion in our creeks and rivers.

Sources of pollution include sediment, nutrients, motor oil, and lawn care products that run off hard surfaces and yards into storm drains. Storm drains typically empty into nearby creeks, lakes, and wetlands without any treatment or filtration. Fortunately for the Boulder Creek and St. Vrain Watersheds, there are BMPs in place to help reduce the impact of these pollutants. A variety of local, state, and federal laws, including the Keep it Clean Partnership (KICP) Partner's ordinances and the federal Clean Water Act, encourage or require the control of pollutants using BMPs. The KICP includes Boulder County; the cities of Boulder, Lafayette, Longmont, and Louisville; and the towns of Erie and Superior. Each work together to protect our water quality.

Do you have a BMP on your property or in your neighborhood? Ponds, ditches and depressions that you see every day may actually be engineered stormwater facilities designed to reduce flooding and improve water quality. The most common BMPs in the KICP communities are detention basins, vegetated swales, vegetated buffers, and designed wetlands. The long-term benefits of BMPs only work if they are maintained regularly.

The development agreement and municipal or Land Use code contains language requiring the property owner and/or HOA to maintain the constructed permanent structural BMP. The stormwater BMP serving your development is generally defined in a deed or plat restricted areas.

It is also important to work with your facility maintenance professional to ensure that their activities do not contribute pollutants to your property. This includes the use of fertilizers or deicers, proper disposal/recycling of chemicals, trash area, pool and landscaping debris management.



*Meet on-site with members of your homeowner's association to find out where your BMPs are located.*

## BMP Lingo

**Basin** - Temporarily stores water before discharging to creek or lake; primarily used to reduce peak discharges, but does not reduce runoff volumes. Can be classified into two groups:

**Extended Detention (dry) Basin** - Stores stormwater runoff, but dries up usually 48-72 hours following a rainstorm or snowmelt.

**Retention Pond (wet) Basin** - Also stores stormwater runoff, but contains a permanent pool of water that will more effectively remove nutrients in addition to other pollutants than other BMPs like a dry pond.

**Best Management Practice (BMP)** - A practice or physical structure that is effective and practical at preventing or reducing the amount of pollution generated by stormwater runoff.

**Buffer** - An area of vegetated land, preferably non-mowed native vegetation, left open adjacent to drainage ways, streams, wetlands, lakes, ponds, and other surface waters for the purpose of minimizing the impacts of runoff.

**Catch Basin Inserts** - Inserts hang from the opening of the curb inlet or below the grate of an area inlet. These inserts catch debris, sediment, and pollutant particles.

**Easements** - Provides for right-of-access for installation, maintenance, and repair of the stormwater BMP.

**Grass-lined Swale** - A vegetated open channel drainage way often times used along residential streets and highways to convey stormwater and filter pollutants in lieu of conventional storm sewers.

**Oil/Grit Separator** - A chamber system designed to remove sediment and absorb hydrocarbons.

**Ordinance** - Regulations implemented to set consistent standards for new development. The KICP communities' ordinances reference Urban Drainage and Flood Control's Volume 3 [http://www.udfcd.org/downloads/down\\_critmanual.htm#vol3](http://www.udfcd.org/downloads/down_critmanual.htm#vol3). Links to individual communities' ordinances are on page 13.

**Porous Landscape** - Depressed vegetated areas, such as vegetated swales or rain gardens filled with planting soil or a sand/soil mix that collects and filters urban stormwater.

**Porous Pavement** - Porous asphalt, concrete, lattice pavers, concrete blocks, or stones laid on a gravel subgrade with voids filled with sand or turf.

**Proprietary/Manufactured Systems** - Devices that use vortex-motion and/or particulate setting treatment mechanisms ( e.g. Stormceptor, Vortechs, BaySaver).

**Stormwater Runoff Pollution** - Comes from diffuse or scattered sources in the environment rather than from a defined outlet such as a pipe. As water moves across and through the land, it picks up and carries away natural and human-made pollutants, depositing them into lakes, rivers, and even underground sources of drinking water.

**Sand Filter** - An excavated basin with sand bed and an under drain system.

**Constructed Wetland Channel or Basin** - A shallow, constructed pool that captures stormwater and allows wetland vegetation to grow.

# Types of Best Management Practices (BMPs)



## RETENTION POND

Retention ponds (wet basins) are man-made with permanent pools of water that function much like natural ponds. Excess runoff is stored above the permanent pool and is released at a controlled rate through an outlet. A wet basin can be more effective when native plants are added to the slopes and bottom. Adding wetland plants around a wet basin is also known as a stormwater wetland detention facility.

The advantages of a wet basin over a dry basin include higher pollutant removal and less chance that pollutants will be suspended during a storm. Wet basins can also serve as an aesthetic or recreational amenity, as well as a habitat for some wildlife and aquatic species. Unmowed native vegetated buffers on the perimeter make the basin less attractive to geese.



## EXTENDED DETENTION BASIN

Extended detention basins (dry basin) temporarily hold stormwater, but they are not effective at pollutant filtering because they are typically planted with turf grass. Dry basins can be used for recreational areas, like soccer fields. Prior to the mid-1980s, dry basins were the most common type of stormwater management facility. Communities encourage the retrofitting of dry basins to extend the emptying time for the more frequently occurring rain events to improve water quality. This is referred to as Full Spectrum Detention. For more on retrofitting, see p. 12.

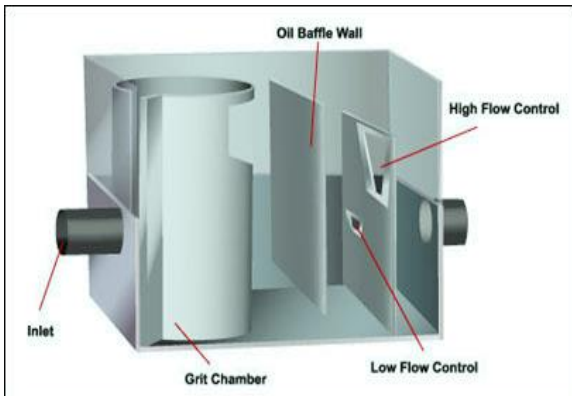


## GRASS BUFFER

Buffers are vegetated areas that surround wet basins and wetlands and run parallel to streams and lakes. Buffers can be effective in filtering and infiltrating pollutants before they reach a water body. Buffer widths can range from 20 feet to 100 feet wide.

## GRASS SWALE

Swales are one of the most commonly used stormwater practices. For many years, they have been used along highways, parking lots, along residential streets, and in between homes to convey water. Swales are designed to slow and infiltrate stormwater runoff.



## PROPRIETARY/MANUFACTURED SYSTEM

Most manufactured BMPs look like inconspicuous manholes; however underneath is a single or series of vaults and chambers designed to remove common stormwater pollutants, such as sediment, oil, trash, and grit. Manufactured BMP facilities are used solely for water quality enhancement, where space for surface facilities is not available.





**BIORETENTION** (rain garden or porous landscape detention)  
Consists of a low-lying vegetated area underlain by a sand bed with an under drain.



**PERMEABLE PAVEMENT**  
Porous pavement consists of a block or porous pavement layer that is underlain by gravel and sand layers in most cases. This BMP is intended to be used in parking lots and in low traffic areas to accommodate vehicles while facilitating stormwater infiltration near its source.



**SAND FILTER** A structural BMP used to capture and treat a volume of stormwater runoff. This BMP is an excavated basin containing a sand filter bed, with an under drain system. Runoff collects in the basin and gradually infiltrates into the sand bed. The under drain then dewateres the sand bed and flows are conveyed to a nearby swale or storm drainage. An outfall is used to drain higher volumes of flow.

# A Plan for Inspecting and Maintaining your BMPs

All properties developing and/or redeveloping over an acre are required to construct a stormwater facility to prevent or reduce the amount of pollution generated by stormwater runoff. The stormwater facilities must be inspected and maintained to ensure water quality is protected.

An inspection and maintenance plan provides a historical record of each facility, can be used in policy creation for the HOA board, and can include a long-term maintenance budget. Inspection and maintenance requirements are available through the individual KICP communities (see page 13). Individual KICP communities may require that inspections be reported annually. The plan can include references to the local requirements. The requirements typically include:

- The party responsible for performing the inspection and maintenance tasks.
- The frequency of BMP inspection reporting.

## All Homeowner's Association who have maintenance responsibilities for stormwater facilities should:

- Get a copy of the site plan and as-built drawings that include all stormwater facility locations and types, easements, deed restrictions, and stormwater facility maintenance plans.
- Meet with the KICP Partner community, and possibly the developer, on-site to discuss the stormwater facilities, including the current condition and near-term and long-term maintenance of each facility.

## INSPECTION AND MAINTENANCE PLAN

### Create a Written Plan

A written plan should include the following:

- Association general information.
- Name, location of site.
- Inventory of facilities, including a copy of the site plan, as-built drawings, inspection and maintenance plan, and other pertinent information such as pictures.
- Regulatory and legal requirements (including legal implications of ownership with regard to facility maintenance and the legal impacts of neglect).
- Inspection schedule.
- Maintenance schedule and/or contract.
- Inspection checklists
- Record-keeping and local government reporting procedures.
- Equipment inventory.
- Description of funding mechanism; collection, distribution of funds; yearly budget approval process; evaluation of services and policies.
- Education schedule.

### Inventory Types of Facilities

The drainage plan will show components of the stormwater system, including basins, wetlands and swales. Consult with the site designer or permitting agency to identify below-ground features, like storm sewers, or above-ground features, like detention basins and native vegetated areas.

### Identify Facility Characteristics and Maintenance Needs

With site plan in hand, walk the site with the developer and/or a representative from the KICP community. For older BMPs, particularly basins, consider taking along someone from your KICP communities' engineering department or a consulting engineer. Take note of the physical and design characteristics of each drainage component and drainage easements. From there, some basic maintenance needs should become obvious. For example, vegetation may not have been sufficiently established around the perimeter of a basin or the outlet structure may contain a debris jam.

### Inspection Checklists

Checklists are essential to ensure that all system components are functioning as originally constructed. They are important not only during inspection, but checklists also provide a historical status of facility functionality. Inspection Checklists can be found beginning on page 17 and may also be provided by local KICP government in which your HOA resides.

### Establish Record-Keeping Procedures

Tracking and recording allows homeowner's associations, facility managers or inspectors to schedule inspections, and to check off observations. A database could include identification numbers for each BMP, BMP type and location, data from previous inspections, special maintenance needs and pictures of your facilities.

### Identify Costs and Allocate Resources

A good rule of thumb is to increase a routine maintenance budget by an average of 3-4 percent each year. For long-term maintenance needs, consult your local government or work with a consulting engineer to estimate the cost of the needed work.

### Conduct Periodic Program Reviews

On a yearly basis, review your inspection program, checklists, and contracts with landscaping companies and other contractors. Other items to check:

- Is the tracking system working, and does it need updating?
- Are you satisfied with professional services currently under contract, and are you getting what you paid for?
- Is the association fee covering maintenance costs, or is there a need to increase it?

### **Identify Inspection Personnel**

Your landscaping company can alert you to maintenance needs on occasion. Routine inspections, however, on the other hand monitor and identify on a regular schedule. Inspections can be done by anyone interested in the task. Volunteer inspectors should be reliable, detail-oriented and willing to train others. A job description and training session should be written up and become part of the maintenance plan.



*Get your homeowner's association involved. Educate members on the maintenance plan, and train volunteers to be inspectors.*

### **Educate the Neighborhood or Community**

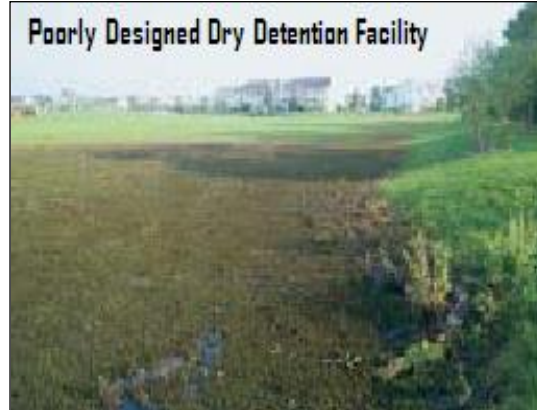
It is imperative that those who live near a basin or another system component understand the purpose of the facility and the practices that keep the facility operating. For example, a native vegetative buffer is often viewed as a "mosquito haven" and aesthetically unpleasant. The preferred view is a manicured lawn mowed up to the banks of a wet basin with little or no vegetation on the perimeter. This mowing will defeat the purpose of the buffer at slowing down the water and removing pollutants. Use your newsletter or a neighborhood gathering to talk about and show the merits of native vegetated buffers. For more on educating your community, see page 8.

### **Reports to Local Governments**

Several of the KICP communities require that annual inspection and maintenance reports be submitted. It is your responsibility to be sure your association is complying with the local government's requirements.



## Signs of a Degraded BMP





# Involving the Community in Maintenance and Pollution Prevention

Even if day-to-day maintenance is left to a professional, involving the community in ongoing BMP maintenance activities is a cost-effective way to prolong the life of the BMP and to prevent pollution.

Most of the time people are unaware that their activities contribute to pollution. Through education, people become aware of how their activities impact water quality and flooding, and they become a stakeholder in protecting their environment.



Please call 303-413-7365 to schedule a water quality speaker for your next HOA meeting, receive support for a stream/BMP team, or have storm drain markers provided!

Share with your neighbors these water protection guidelines:

- Always pick up after pets. Place their waste in the trash, or flush it down the toilet.
- Recycle or properly dispose of household and business hazardous waste. Call the Boulder County HMMF Hotline at 720-564-2251.
- Wash your car at a commercial carwash that treats its wastewater, or wash your car in your yard so the water soaks into the ground.
- Keep cars tuned up and in good operating condition. Check for drips and repair leaks immediately to keep oil off the pavement. Walk, bike or take the bus.
- Direct downspouts to planting beds and lawns where water can soak into the ground.
- Allow pools to dechlorinate before draining to landscaping or as a last resort to the storm drain system. Cleaning operations or chemicals must be sent to the sanitary sewer, with permission of the local wastewater treatment facility.
- Sweep walks and driveways instead of hosing them down.
- Store landscaping materials away from parking lots, streets or driveways where runoff will carry the material to the storm drain.
- Recycle or put litter in the trash.
- Fertilize in the fall, if at all, to reduce algal blooms.
- Call emergency communications at 303-441-4444 if you see illegal dumping.

## Property Manager Guidance

Would it be helpful to have assistance working with your property management company to be sure they are performing maintenance activities with water quality protection in mind? Please call Boulder County's Partners for a Clean Environment (PACE) at 303-786-7223 to schedule assistance.

## EASEMENT ON YOUR PROPERTY

If you have a BMP in your subdivision or on your property, a deed restriction or easement is required. These legally binding agreements noted on the plat and in your purchasing agreement for your home allow access to stormwater facilities and require the property owner to maintain the access point.

BMPs that typically need a dedicated easement include detention basins, overland flow paths, swales, wetlands, and buffers.

## Easement Do's and Don'ts

### Do

- Plant trees and shrubs at the top of the embankments or berms to avoid blocking the flow of water. Native, water-tolerant grasses and wetlands plants however can be planted at the base of a basin or swale.
- Plant non-woody trees, shrubs and flowers away from outlets and inlets to avoid root blockages.

### Don't

- Do not erect any permanent structures like buildings, walls or fences made of blocks or bricks.
- Do not install tennis courts, swimming pools, dams or anything that might block the flow of water.



Educate your neighbors  
about your BMPs.

# Inspecting Your BMPs

## Maintenance Program Components

- Regular Inspections
- Vegetation Management
- Embankment and Outlet Stabilization
- Debris and Litter Control
- Mechanical Components/Inlet/Outlet Replacement
- Insect Control
- Maintenance of Access Route to BMP
- Overall Pond Maintenance
- Sediment/Pollutant Removal

## REGULAR INSPECTIONS

This section outlines the maintenance needs for the most common types of BMPs found in the KICP communities. It is important to remember that while general maintenance tasks can be outlined, actual maintenance needs will vary according to specific site conditions. Many BMP inspections are conducted on an annual or semi-annual inspection schedule.

**Consider evaluating the storm system in general. A storm system consists of inlets, manholes, underground pipes and curb and gutter. In most cases, it is the property owner's responsibility to maintain these systems. Private systems must be kept in clean working order - as they drain to public systems or waterways. Be sure that the contractor you hire to clean your system does not 'push' the sediment in the inlets or pipes downstream but instead collects and removes it!**

## VEGETATION MANAGEMENT

Most BMPs heavily rely on vegetation to filter out pollution and to prevent erosion on embankments and slopes. The following is a quick reference on how to keep your vegetation healthy.

- **Mowing.** Short grass (Kentucky blue grass, etc.) may look nice, but it doesn't have a deep root system and is ineffective as a pollutant filter. Cut grass no shorter than 6-8 inches, particularly grass near basin embankments and slopes. Never mow down to the water's edge. In fact, replace your grass around wet basins with native vegetated buffers.
- **Minimize Weed and Pest Control.** More is not better when it comes to fertilizing and pesticide use, especially near basins, swales, lakes and streams. Excess fertilizer can flow off your lawn and into storm sewers that eventually drain into nearby water bodies.

- **Reduce Non-Native Vegetation.** Non-native species can impact a BMP's effectiveness by blocking out the more effective long-rooted native vegetation. Short-rooted non-native species can actually destabilize a BMP's embankment or slope, and reduce the BMP's pollutant filtering capabilities. Monitoring, mowing and prescribed burning can help control unwanted, non-native species.
- **Create No Mow Zones.** Quality wetland areas benefit having native vegetated buffers up to 100 feet.

## Factors Affecting Type and Frequency of Maintenance

**Function of the BMP Facility.** Inspections will vary depending on the type of BMP.

**Visibility of the BMP Facility.** The needs and preferences of the surrounding community will determine, to a large extent, the amount of maintenance for aesthetics and BMP facility effectiveness.

**Landscaping.** Maintenance needs will vary, depending on the types of vegetation used in landscaping. Native vegetation needs less care and less mowing than turf grass.

**Upstream Conditions.** The conditions of the watershed upstream from your BMP can significantly impact the amount of sediment and other pollutants entering your BMP facility. Upstream commercial areas or roads may result in an increased need for litter and sediment removal and other maintenance tasks.

**Safety.** Since BMPs can often involve the impoundment of water, the safety of nearby residents must be considered.

**Need for Professional Judgment.** BMPs are water treatment, as well as storage facilities. While some routine maintenance can be undertaken by a nonprofessional, the judgment of a professional should be consulted regularly.

**Financing.** The costs associated with non-routine BMP maintenance tasks can be considerable. A fund should be established to provide for the costs of long-term needs, such as sediment removal.

*Source: Northern Virginia Planning District, Division of Environmental Services*

## Who Should Carry out Maintenance?

Cost, safety, and effectiveness are key factors in determining who will carry out your maintenance needs. Some of the more routine maintenance tasks can be done by the BMP facility owner. Those tasks may include landscaping, educating the neighborhood, and litter removal.

It is recommended that a professional landscaping company be hired for the more difficult routine work, such as mowing, burning, working around sloping embankments, stabilizing eroded areas, and replanting vegetation. Trained professionals can also identify problems early on thus avoiding expensive repairs later.

Colorado State University Stormwater Center offers a 2-day workshop on how to properly perform inspection and maintenance activities for BMPs. The attendees that successfully pass an exit exam will receive Permanent Stormwater BMP Maintenance Certification and their names/company will be listed on the [website](#).

Professional engineers may be required to retrofit or provided extensive maintenance.

### TIPS FOR WORKING WITH LAWN CARE COMPANIES

Discuss your BMP maintenance needs with your landscaping company manager. Objectives might include:

- Communicate that the facility is a water quality device.
- Communicate mowing practices: for instance, mowing at a higher level and perhaps not as frequently, or not at all especially in buffer areas. You also can request that use of heavy equipment be avoided where possible particularly in vegetated areas.
- Communicate the need to keep the BMP facility clear of grass clippings and leaf piles (convey this to the residents as well).
- Ask whether the company follows an integrated pest management (IPM) plan, and minimize the application of pesticides and fertilizers. An IPM plan can include:
  - Use of pesticides only as needed and only in trouble spots.
  - Use of alternatives to pest control or no control at all.
  - Policy of not applying chemicals when there is a heavy rainfall in the forecast.
  - Testing the soil before applying low-phosphorous fertilizer.

**TIP:** The key is communication. If the company cannot agree or is not willing to agree to your needs, find another company that will.

### EMBANKMENT AND OUTLET STABILIZATION

Finding the source of erosion and stabilizing it can improve the effectiveness of a wet basin or swale. Left unchecked, an erosion problem can necessitate dredging, replacement of an entire embankment or slope, or even an inlet structure. A prime cause of erosion is lack of deep-rooted vegetation that holds soil in place. There are several techniques to stabilize banks, including the combination of structural products.

In addition to erosion, problems like sink holes; a rusty, broken, or crushed pipe; odor; or algae blooms are all clear indications to call a consulting engineer.

Animal burrows also will deteriorate embankment integrity. Take steps to control animal burrowing by quickly filling existing holes.

### DEBRIS AND LITTER CONTROL

Regularly check for litter, debris and floating debris. Floating debris can clog basin inlets and outlets and swales. If dumping is a problem, outreach to the neighborhood can help.

### MOSQUITOES

Mosquito's breeding grounds can be created in shallow ponds of standing water. The development of a mosquito problem is usually an indication of a maintenance problem. It is likely the infiltration capacity of the BMP needs to be increased, or sediment needs to be removed. It takes only 72 hours for larvae to hatch in standing water. Another insect control option for larger wet basins is to maintain a stock of fish to feed on mosquito larvae. In addition, natural vegetated buffers can provide shelter for mosquito predators.

### MAINTENANCE OF ACCESS ROUTE TO BMP

Access to BMPs for routine and non-routine maintenance is critical. For more on easements, see page 8.

### OVERALL EXTENDED DETENTION BASIN MAINTENANCE

A healthy wet basin should require little maintenance. A good indicator of an unhealthy ecosystem is excessive algae growth. This could be caused by nutrients from fertilization practices by a landscape company or surrounding neighbors, upstream activities, or excess sediment.

Steps should be taken to reduce nutrients at their source and encourage the growth of more desirable aquatic and emergent vegetation in a wet basin.

### SEDIMENT/POLLUTION REMOVAL

Since the primary purpose of a BMP is to remove sediment and other pollutants from stormwater runoff, sediment will eventually accumulate in a BMP and needs to be removed. There are no specific rules governing the timing of sediment removal because facility maintenance varies. However, some general guidelines on sediment removal frequency are listed below.

#### SEDIMENT REMOVAL FREQUENCY

BMP	Sediment Removal Frequency
Wet Basin	5-15 years
Dry Basin	2-10 years
Sand Filter	6 months
Bioretention	5-10 years
Vegetated Swale	2 years
Porous Paving	3-4 years



## Maintenance Costs

	Maintenance	Annual Associated Cost
<b>Bioretention</b>	Removal of sediments and replacement of some level of soil is required periodically. Mulch should be replaced annually, or as needed.	\$1,500 - \$2,000, depending upon the size and complexity of the facility.
<b>Grass Swale/ Grass Buffer</b>	Remove sediments, replace check dams (usually made of earth, riprap, or wood), reseed or sod (if grassed) or replace dead plants, every two years.	Cost of grass maintenance and sediment removal Approximately \$0.76/linear foot
<b>Porous Paving</b>	Vacuum sediments from surface, twice a year.	\$500 - \$1,000, depending on the size of the facility.
<b>Sand Filter</b>	Remove the top filter cloth and remove/replace the filter gravel when a semiannual inspection reveals it is necessary. Remove and replace the filter cloth and gravel every three to five years.	\$3,000 - \$10,000, depending on the type and size of the sand filter and the amount of impervious surface draining to it.

### ROUTINE MAINTENANCE COST CONSIDERATIONS

Costs for mowing, weed control, fertilization and debris removal are typically calculated per acre, per year. Cost estimates can be obtained from lawn care companies and a general rule of thumb is to increase your yearly maintenance budget by 3-4 percent for these activities.

Generally, annual maintenance costs may run from \$100 per acre for minor maintenance, such as mowing, to \$500 per acre for more intensive maintenance including weed control, debris removal, etc.

**TIP:** The non-routine maintenance needs of a BMP, while infrequent, can be a major undertaking in terms of funding and logistics, and should always be performed by a consulting engineer.

### NON-ROUTINE MAINTENANCE COST CONSIDERATIONS

A BMP maintenance fund, with annual contributions, should be established. Consider hiring a consulting engineer to conduct a replacement fund study. When a fund is started, the primary non-routine maintenance cost is typically related to wet basin pollutant and sediment removal, or dredging.

#### Wet Basin Dredging

Dredging restores the BMP to its original intent as required by local ordinance, and will likely improve it by:

- Removing excessive sediments.
- Removing nutrient rich or toxic sediments.
- Removing rooted aquatic plants.
- Preventing fish kills.
- Creating better habitat for fish.

Associations should have a copy of the “as built” drawings of their wet basin(s) depth contours. It is recommended that depth contours be checked about every two years unless there is a significant change in the basin’s functions. Seek a consulting engineer or basin management company to determine if the depths of the basin have changed to the point that they no longer resemble what was designed and built.

A major cause of depth reduction includes high sediments loads from upstream construction site erosion, shoreline erosion, agricultural runoff and decaying aquatic plants. Ideally, you would want to correct these types of problems prior to dredging.

If dredging is the last option, a dredging feasibility study would be performed to determine areas to be dredged and to estimate dredging costs. The cost depends on the volume of sediment removed based on cubic yards, and sediment disposal. **Permits may be needed from local, state and federal agencies.** (See page 13 for contact information.)

### **Cost Considerations**

Depending on the size of the basin, equipment will either be waterborne (mounted to a floating barge) or on the perimeter of the basin. Additional costs for the construction of access roads and heavy equipment may be required if not already provided in the cost. The primary determinant of disposal costs is whether on-site disposal is an option. If on-site disposal is not available, landfill and transportation costs can be high.

### **BMP Component Replacement**

Eventually, like most infrastructure, some BMP components may need replacing and should be part of a BMP replacement fund.

Components may include:

- inflow, outflow devices
- trash racks
- valves, orifices
- pumps and switches
- earthwork, such as embankments and side slope

stabilization

- mulches and vegetation.

### **Need a Retrofit?**

Retrofits are stormwater treatment practices put into place after development has occurred to improve water quality, protect downstream BMPs and water resources, reduce flooding, or meet other watershed restoration goals. Retrofit opportunities include:

**Creating a wet or stormwater wetland basin:** Dry basins can be converted to wetland basins by excavating portions of the basin bottom to create wetland pockets and/or redesigning the outlet to allow for some water retention. Wetland and native prairie vegetation is then planted on the bottom and on banks.

**Stabilizing shorelines and improve buffers:** Shorelines of wet basins with erosion problems could be stabilized using native vegetation. Native vegetation buffers should be established around the perimeter of all basins where possible to stabilize shorelines, filter pollutants, and discourage nuisance geese.

**Replacing turf grass with native vegetation:** Turf grass is relatively intolerant of water level fluctuations and is maintenance-intensive. It also is not as effective as native vegetation for filtering pollutants. Turf grass should be replaced with native vegetation.

***Seek a consulting engineer to retrofit your BMP.***

*Source: Watershed Management Institute.*

# Keep it Clean Partnership Contacts for BMP Program Information

## City of Boulder

Scott Kuhna, Civil Engineer II  
City of Boulder Public Works  
1739 Broadway, Suite 300  
Boulder, CO 80306-0791  
303-441-4071

[kuhnas@bouldercolorado.gov](mailto:kuhnas@bouldercolorado.gov)

[Boulder Code Chapter 11-5 - Section 11-5-6](#)

## County of Boulder

Dave Webster, Engineer  
Boulder County Transportation/Engineering  
PO Box 471  
Boulder, CO 80306  
720-564-2660

[dwebster@bouldercounty.org](mailto:dwebster@bouldercounty.org)

[Boulder County Land Use Code Article 7-904](#)

## Town of Erie

Wendi Palmer, Engineer  
Town of Erie  
645 Holbrook  
Erie, CO 80516  
303-926-2875

[wpalmer@erieco.gov](mailto:wpalmer@erieco.gov)

[Erie Code Chapter 4 Section 8-4-14](#)

## City of Lafayette

Mick Forrester, Public Works  
City of Lafayette  
1290 S. Public Road  
Lafayette, CO 80026  
303-665-5506 ext. 3571

[mickf@cityoflafayette.com](mailto:mickf@cityoflafayette.com)

[Lafayette Chapter 104-43](#)

## City of Longmont

Kathryne Marko, Associate Civil Engineer  
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303-651-8906

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[Longmont Code 14.26.110](#)

## City of Louisville

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City of Louisville Public Works  
749 Main Street  
Louisville, CO 80027  
303-335-4611

[fowlkesc@louisvilleco.gov](mailto:fowlkesc@louisvilleco.gov)

[Louisville code 13.36.160](#)

## Town of Superior

Dave Heinrich, Engineer  
Town of Superior  
124 East Coal Creek Drive  
Superior, CO 80027  
303-499-3675

[davidh@superiorcolorado.gov](mailto:davidh@superiorcolorado.gov)

[Superior Code Article XXXIX Section 16-799](#)



## KICP Support

Janice Lopitz, KICP Coordinator  
Boulder County Public Health  
3450 Broadway  
Boulder, CO 80304  
303-441-1439

[jlopitz@bouldercounty.org](mailto:jlopitz@bouldercounty.org)

Erin Dodge, PACE Coordinator  
Boulder County Public Health  
3450 Broadway  
Boulder, CO 80304  
303-441-1241

[edodge@bouldercounty.org](mailto:edodge@bouldercounty.org)

Russ Sands, Watershed Outreach Coordinator  
City of Boulder Water Quality  
4049 75th Street  
Boulder, CO 80301  
303-414-7407

[sandsr@bouldercolorado.gov](mailto:sandsr@bouldercolorado.gov)



## Other Resources

### Center for Watershed Protection

Works to protect, restore, and enhance streams, rivers, lakes, wetlands, and bays.

[www.cwp.org](http://www.cwp.org)

### Colorado Association of Storm and Floodplain Managers

An organization of professionals whose members are involved in floodplain management, flood hazard mitigation, stormwater management, the National Flood Insurance Program, and flood preparedness, warning, and recovery.

[www.casfm.org](http://www.casfm.org)

### Colorado Stormwater Center at Colorado State University

The Colorado Stormwater Center at Colorado State University provides stormwater-related education, training and research with the goal of maintaining and improving the health of lakes, rivers and streams through proper stormwater management.

[www.stormwatercenter.colostate.edu](http://www.stormwatercenter.colostate.edu)

### GreenCO

For additional information on managing vegetation in a manner that conserves water and protects water quality, see the 2008 *GreenCO Best Management Practices Manual* for a series of Colorado-based BMP fact sheets on topics such as irrigation, plant care, and soil amendments.

[www.greenco.org](http://www.greenco.org)

### Household Hazardous Waste Disposal

No charge to residents. Funded by Boulder and Broomfield counties; the cities of Boulder, Lafayette, Longmont and Louisville; and the towns of Erie and Superior.

720-564-2251

[www.bouldercounty.org/recycling/hhw/hhwhome.htm](http://www.bouldercounty.org/recycling/hhw/hhwhome.htm)

### Nonpoint Source Colorado

A collaboration to reduce nonpoint source pollution in Colorado.

[www.npscolorado.com](http://www.npscolorado.com)

### Partner for a Clean Environment (PACE) Program

A representative can meet with the facility manager to discuss pollution prevention as it relates to maintenance activities of your property. [facility manager brochure](#) [PACE](#) 303-786-7223

### Storm drain Stenciling Information and Stormwater Presentations

Organize a stream team or expert presentation, mark storm drains, and/or become a water steward.

[www.keepitcleanpartnership.org](http://www.keepitcleanpartnership.org)

303-413-7365

### Stormwater Manager's Resource Center Stormwater Center

Link to various fact sheets on stormwater, BMPs, and other useful information. [www.stormwatercenter.net](http://www.stormwatercenter.net)

### Urban Drainage and Flood Control District

Established by the Colorado legislature in 1969 for the purpose of assisting local governments in the Denver metropolitan area with multi-jurisdictional drainage and flood control problems. Volume 3 provides guidance for the selection, design, and maintenance of stormwater quality best management practices. [www.udfcd.org](http://www.udfcd.org)

### US Environmental Protection Agency - Nonpoint Source Pollution Best Management Practices (USEPA)

[www.epa.gov/owow/nps/bestnpsdocs.html](http://www.epa.gov/owow/nps/bestnpsdocs.html)

### US EPA - Stormwater Program

[EPA stormwater](#)

### US EPA Wetlands Website

The value of wetlands, why they need protection and your role as a homeowner and landowner are included on this website. [www.epa.gov/OWOW/wetlands](http://www.epa.gov/OWOW/wetlands)

## BMP Maintenance Contractors

### [Airvac Services](#)

383 W 56<sup>th</sup> Ave  
Denver, CO 80216  
303-299-9300

Anderson Services  
1125 Quaker St  
Golden, CO 80401  
303-277-1112

Arapahoe Utilities & Infrastructure  
14251 East Fremont Avenue, Suite E  
Englewood, CO 80112  
303-690-2180

### [Arrowhead Landscaping, Inc.](#)

15650 East 144<sup>th</sup> Avenue  
Brighton, CO 80601  
303-655-1247

### [Apex Companies, LLC](#)

3240 West 71<sup>st</sup> Avenue, Ste 1  
Westminster, CO 80030  
303-487-1020

Clear Water Environmental  
10750 Irma Drive #24  
Northglenn, CO 80233  
303-237-4209

Cocal Landscape Construction Company  
1820 Delaware Pl  
Longmont, CO 80501  
303-774-0599

### [Down to Earth Compliance, LLC](#)

7845 E. Havard Avenue  
Denver, CO 80321  
303-306-1606

### [Edge Contracting, Inc.](#)

1453 Brickyard Road  
Golden, CO 80403  
303-339-1050

### [Goodland Construction](#)

760 Nile Street  
Golden, CO 80401  
303-278-8100

JPD, Inc.  
6255 East 88<sup>th</sup> Avenue, Suite A-3  
Henderson, CO 80640  
303-975-8774

Kemp and Hoffman, Inc.  
11445 Riverdale Road  
Northglenn, CO 80233  
303-294-0775

### [L&M Enterprises](#)

735 E. Hwy 56  
Berthoud, CO 80513  
970-532-3232

Left Hand Excavating  
7733 North 73<sup>rd</sup> Street  
Longmont, CO 80503  
303-833-3326

### [McDonald Farms](#)

7440 E I-25 Frontage Road  
Frederick, CO 80530  
303-772-4577

### [Napp Landscape Services Inc](#)

615 Main St  
Longmont, CO 80501  
303-651-0738

Rapid Vac Service Inc.  
P.O. Box 2289  
Arvada, CO 80001  
303-422-2959

### [RNR Enterprises](#)

5808 Franklin St  
Denver, CO 80216  
866-988-4166

### [Rock Solid Landscapes](#)

3686 Stagecoach Rd  
Longmont, CO 80504  
303-772-4736

### [Sun and Shade, Inc](#)

4100 Mulligan Street  
Longmont, CO 80503  
303-702-1228

[Territory Unlimited](#)

Post Office Box 1693  
Berthoud, CO 80513  
970-667-8377

Turf Paradise  
P.O. Box 1533  
Longmont, CO 80501  
303-419-5215

VSR Corp.  
11730 Wadsworth Blvd.  
Broomfield, CO 80020  
303-280-3852

Ward's Landscape Inc  
9165 Nelson Rd  
Longmont, CO 80503  
303-776-7991

**NOTE:** The list of consultants and vendors is provided as a public service and does not constitute a recommendation, endorsement, or certification of their qualifications or performance record, nor does the absence of a consultant or vendor from the list constitute a negative endorsement. While an effort has been made to provide a complete and accurate listing, omissions or other errors may occur, and therefore, other available sources of information should be consulted.

Those seeking professional services are advised to use independent judgment in evaluating the credentials of any consultants and vendors appearing on these lists.

If you would like to be included in the list, please call 303-441-1439.

Colorado State University Stormwater Center offers a 2-day workshop on how to properly perform inspection and maintenance activities for BMPs. The attendees that successfully pass an exit exam will receive Permanent Stormwater BMP Maintenance Certification and their names/company will be listed on the [website](#).



# **BMP INSPECTION CHECKLISTS**

(adapted from [Urban Drainage and Flood Control District, Vol. 3](#))

Retention pond (wet basin) and Constructed wetland pond

Extended detention basin (dry basin)

Grass buffer

Grass swale

Proprietary/Manufactured System

Bioretention (rain garden or porous landscape detention)

Modular block porous pavement

Permeable pavement

Sand filter

Constructed Wetland Channels

## ANNUAL BMP INSPECTION REPORT

Owner/Corporation \_\_\_\_\_

Location of Property/Plat # \_\_\_\_\_

Date of Annual Inspection Report \_\_\_\_\_

Signature of person completing annual report/phone # \_\_\_\_\_

\_\_\_\_\_  
Please print name

Type of Facility	Location	Date Maintenance Completed	Type of Work Completed	Work Performed By	Sediment Removal (quantity/disposal location)	Overall condition of Facility (properly functioning?)

**Please attach copies of the routine inspection checklists completed throughout the year covered in this report.**

**ADDITIONAL COMMENTS (include any problems encountered and any maintenance activity anticipated for the following year):**

# Retention Pond (Wet Basin) and Constructed Wetland Ponds Inspection Checklist

Owner/Corporation \_\_\_\_\_

Date of Inspection \_\_\_\_\_

Inspection Performed by (w/signature) \_\_\_\_\_

Location of Facility \_\_\_\_\_

Required Action	Maintenance Objectives	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated
Lawn mowing and lawn care	Mow occasionally to limit unwanted vegetation. Maintain irrigated turf grass at 2 to 4 inches tall and nonirrigated native turf grasses at 4 to 6 inches.	Routine – depending on aesthetic requirements.			
Debris and litter removal	Remove debris and litter from entire pond to minimize outlet clogging and aesthetics. Include removal of floatable material from the pond's surface.	Routine – including just before annual storm seasons (i.e. in April and May) and following significant rainfall events.			
Sediment removal	Remove accumulated sediment and muck along with much of the wetland growth. Re-establish growth zone depths and spatial distribution. Revegetate with original wetland species.	Nonroutine – every 10 to 20 years from the pond bottom as needed by inspection. If no construction activities take place in the tributary watershed; more often if they do. Expect to clean out forebay every 1 to 5 years.			
Aquatic plant harvesting	Cut and remove plants growing in wetland (such as cattails and reeds) to remove nutrients permanently with manual work or specialized machinery.	Nonroutine until further evidence indicates such action would provide significant nutrient removal. In the meantime, perform this task once every 5 years or less frequently, as needed, to cleanout the wetland zone. Perform this activity during the dry season (November to February).			
Structural repairs	Repair such items as inlet/outlet works and energy dissipator liners. Stabilize banks and berms. Repair damage caused by larger storm events.	Nonroutine – as necessary per inspection.			



Sediment removal	Empty the pond, divert the base flow, and dry out bottom sediments in fall and winter months to allow access with backhoe. Remove accumulated sediment along with aquatic growth overlaying them. Re-establish original design grades and volumes and replant aquatic vegetation.	Nonroutine – as indicated per inspections and sediment accumulation. Expect to do this every 10 to 20 years if no construction activities take place in the tributary watershed; more often if they do. Expect to clean out the forebay every 1 to 5 years.			
Inspections	Observe inlet and outlet works for operability. Verify the structural integrity of all structural elements, slopes, and embankments.	Routine – at least once a year, preferably once during one rainfall event resulting in runoff.			

Adapted from Urban Drainage and Flood Control District, Vol. 3

# Extended Detention Basin (Dry Basin) Inspection Checklist

Owner/Corporation \_\_\_\_\_

Date of Inspection \_\_\_\_\_

Inspection Performed by (w/signature) \_\_\_\_\_

Location of Facility \_\_\_\_\_

Required Action	Maintenance Objectives	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated
Lawn mowing and lawn care	Occasional mowing to limit unwanted vegetation. Maintain irrigated turf grass as 2 to 4 inches tall and nonirrigated native turf grasses at 6 inches. Aerate turf grass.	Routine – depending on aesthetic requirements.			
Debris and litter removal	Remove debris and litter from the entire pond to minimize outlet clogging and improve aesthetics.	Routine – including just before annual storm seasons (i.e. April and May) and following significant rainfall events.			
Erosion and sediment control	Repair and revegetate eroded areas in the basin and channels. Remove sediment from the forebay and trickle channel annually. Sediment removal from the micropool is required about once every one to four years, and should occur when the depth of the pool has been reduced to approximately 18 inches. Remove sediment from the bottom of the basin when accumulated sediment occupies about 20% of the water quality design volume or when sediment accumulation results in poor drainage within the basin.	Nonroutine – periodic and repair as necessary based on inspection.			
Structural	Repair pond inlets, outlets, forebays, low-flow channel liners, and energy dissipators whenever damage is discovered.	Nonroutine – repair as needed based on regular inspections.			
Inspections	Inspect irrigation, turf grass density, flow distribution, gully development, and traces of pedestrian or vehicular traffic and request repairs, as needed.	Annually and after each major storm (that is, larger than 0.75 inches in precipitation).			

Adapted from Urban Drainage and Flood Control District, Vol. 3

# Grass Buffer Inspection Checklist

Owner/Corporation \_\_\_\_\_

Date of Inspection \_\_\_\_\_

Inspection Performed by (w/signature) \_\_\_\_\_

Location of Facility \_\_\_\_\_

Required Action	Maintenance Objective	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated
Lawn mowing	Maintain a dense grass cover at 2-6 inches. Collect and dispose of cuttings offsite or use a mulching mower.	Routine – as needed or recommended by inspection.			
Lawn care	Use minimum amount of biodegradable, nontoxic fertilizers and herbicides needed to maintain dense grass cover, free of weeds. Reseed and patch damaged areas. Aerate.	Routine – as needed.			
Irrigation	Adjust timing sequence and water cover to maintain required minimum soil moisture for dense grass growth. Do not overwater.	As needed.			
Litter removal	Remove litter/debris to prevent gully development, enhance aesthetics, and prevent floatables from being washed offsite.	Routine – as needed by inspection.			
Inspections	Inspect irrigation, turf grass density, flow distribution, gully development, and traces of pedestrian or vehicular traffic and request repairs, as needed.	Routine - At least twice annually and after each major storm (that is, larger than 0.75 inches in precipitation).			
Turf maintenance	To lower the turf below the surface of the adjacent pavement, use a level flow spreader, so that sheet flow is not blocked and will not cause water to back up onto the upstream pavement. Remove any accumulated sediment.	As needed, when water padding becomes too high or too frequent a problem. The need for turf replacement will be higher if the pavement is sanded in winter to improve tire traction on ice. Otherwise, expect replacement once every 5 to 15 years.			

Adapted from Urban Drainage and Flood Control District, Vol. 3

# Grass-Lined Swale Inspection Checklist

Owner/Corporation \_\_\_\_\_  
 Date of Inspection \_\_\_\_\_  
 Inspection performed by (w/signature) \_\_\_\_\_  
 Location of Facility \_\_\_\_\_

Required Action	Maintenance Objective	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated
Lawn mowing and lawn care	Maintain irrigated grass at 2-4" tall and nonirrigated native grass at 6-8" tall. Collect cuttings/dispose of them offsite, or use a mulching mower. Aerate.	Routine – as needed.			
Debris and litter removal	Keep the area clean for aesthetic reasons, which also reduces floatables being flushed downstream.	Routine – as needed by inspection; no less than two times/year.			
Sediment removal	Remove accumulated sediment near culverts and in channels to maintain flow capacity. Replace the grass areas damaged in the process.	Routine – as needed by inspection. Estimate the need to remove sediment from 3-10% of total length per year, as determined by annual inspection.			
Grass reseeding and mulching	Maintain a healthy dense grass in channel and side slope.	Nonroutine – as needed by annual inspection.			
Inspections	Check the grass for uniformity of cover, sediment accumulation in the swale, and near culverts.	Routine – At least twice annually and after each major storm (that is, larger than 0.75 inches in precipitation).			

Adapted from Urban Drainage and Flood Control District, Vol. 3



# Proprietary/Manufactured System Inspection Checklist

Owner/Corporation \_\_\_\_\_  
 Date of Inspection \_\_\_\_\_  
 Inspection performed by (w/signature) \_\_\_\_\_  
 Location of Facility \_\_\_\_\_

Required Action	Maintenance Objective	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated
Debris and litter removal	Remove any flow blocking debris as soon as possible following inspection.	Routine – as needed. Follow the manufacturer's recommended maintenance requirements.			
Sediment removal	Remove accumulated sediment and watch for signs of standing water for more than 24hours.	Routine – as needed. Follow the manufacturer's recommended maintenance requirements.			
Inspections	Specifically look for debris that could cause the structure to bypass water quality flows. Strong odors may also indicate that the facility is not draining properly. Inspection should be performed by a person who is familiar with the operation and configuration of the BMP.	Routine - Inspect underground BMPs at least quarterly for the first two years of operation and then twice a year for the life of the BMP, if a reduced inspection schedule is warranted based on the initial two years.			

Adapted from Urban Drainage and Flood Control District, Vol. 3

# Bioretention (Rain Garden or Porous Landscape Detention) Inspection Checklist

Owner/Corporation \_\_\_\_\_  
 Date of Inspection \_\_\_\_\_  
 Inspection Performed by (w/signature) \_\_\_\_\_  
 Location of Facility \_\_\_\_\_

Required Action	Maintenance Objectives	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated
Lawn mowing and vegetative care	Occasional mowing of grasses and weed removal to limit unwanted vegetation. Maintain irrigated turf grass at 2 inches tall and nonirrigated native turf grasses at 4 to 6 inches. Replace wood mulch when needed to maintain a mulch depth of 3 inches.	Routine – depending on aesthetic requirements.			
Debris and litter removal	Remove debris and litter from detention area to minimize clogging of the media. If clogging is primarily related to sediment accumulation remove accumulated sediment and scarify the surface with a rake.	Routine – depending on aesthetic requirements			
Landscaping removal and replacement	The sandy loam turf and landscaping layer will clog with time. This layer will need to be removed and replaced, along with all turf and other vegetation growing on the surface, to rehabilitate infiltration rates.	Every 5 to 10 years, depending on infiltration rates needed to drain the WQCV in 12 hours or less. May need to do it more frequently if exfiltration rates are too low to achieve this goal.			
Inspections	Inspect detention area to determine if the bioretention area is providing acceptable infiltration. If standing water persists for more than 24 hours clogging should be further investigated.	Routine – biannual inspection of hydraulic performance.			

Adapted from Urban Drainage and Flood Control District, Vol. 3

# Modular Block Porous Inspection Checklist

Owner/Corporation \_\_\_\_\_  
 Date of Inspection \_\_\_\_\_  
 Inspection Performed by (w/signature) \_\_\_\_\_  
 Location of Facility \_\_\_\_\_

Requires Action	Maintenance Objective	Frequency of Action	Work Completed/Date	Overall condition of Facility (properly functioning or not?)	Future Work Anticipated
Debris and litter removal	Accumulated material should be removed as a source control measure.	Nonroutine – as needed.			
Maintenance	If sandy loam turf is used, provide lawn care; the irrigation system; and inlay depth maintenance, as needed.  If aggregate infill is used, use a regenerative air or vacuum sweeper twice a year to maintain infiltration rates.	Routine – As dictated by inspection.			
Snow Removal	In general, permeable pavements do not form ice to the same extent as conventional pavements. Additionally, conventional liquid treatments (deicers) will not stay at the surface of a permeable pavement as needed for the treatment to be effective. Sand should not be applied to a permeable pavement as it can reduce infiltration. Plowing is the recommended snow removal process.	Nonroutine – as needed.			
Replacement of surface filter	Follow industry guidelines for underground repairs.  If surface is clogged and rendering a minimal surface infiltration rate, restoration of surface infiltration can be achieved by removing the first ½ to 1 inch of soiled aggregate infill material with a vacuum sweeper. After cleaning, the openings in the PICP will need to be refilled with clean aggregate. Replacement of the infill is best accomplished with push brooms.	Nonroutine – when it becomes evident that runoff does not rapidly infiltrate into the surface. May be as often as every year or as little as every 5 to 10 years.			

Inspection	Inspect representative areas of surface filter sand or sandy turf for accumulation of sediment or poor infiltration.	Routine and during a storm event to ensure that water is not bypassing these surfaces by not infiltrating.			
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Adapted from Urban Drainage and Flood Control District, Vol. 3

# Permeable Pavement Inspection Checklist

Owner/Corporation \_\_\_\_\_  
 Date of Inspection \_\_\_\_\_  
 Inspection Performed by (w/signature) \_\_\_\_\_  
 Location of Facility \_\_\_\_\_

Required Action	Maintenance Objectives	Frequency of Action	Work Completed/Date	Overall condition of Facility (properly functioning or not?)	Future Work Anticipated
Debris and litter removal	Accumulated material should be removed as a source control measure. Use a vacuum or regenerative air sweeper to help maintain or restore infiltration approximately twice per year to maintain infiltration rates.	Nonroutine – as needed.			
Snow Removal	In general, permeable pavements do not form ice to the same extent as conventional pavements. Additionally, conventional liquid treatments (deicers) will not stay at the surface of a permeable pavement as needed for the treatment to be effective. Sand should not be applied to a permeable pavement as it can reduce infiltration. Plowing is the recommended snow removal process.				
Inspection	Inspect representative areas of surface filter sand accumulation of fine sediment.	Routine and during a storm event to ensure that water is not bypassing these surfaces or taking too long to drain out.			
Replacement of surface filter	Partial replacement of pervious pavement should be avoided. If clogged, power washing or power blowing should be attempted prior to partial replacement. Replacement may be used in patches, provided that 90 percent of the original pervious surface is maintained.	Nonroutine – when it becomes evident that runoff does not rapidly infiltrate into the surface, namely, the ponded water does not drain within one hour. May be as often as once a year or as little as once every 5 to 10 years.			

Adapted from Urban Drainage and Flood Control District, Vol. 3



# Sand Filter Inspection Checklist

Owner/Corporation \_\_\_\_\_  
 Date of Inspection \_\_\_\_\_  
 Inspection Performed by (w/signature) \_\_\_\_\_  
 Location of Facility \_\_\_\_\_

Required Action	Maintenance Objectives	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated
Debris and litter removal	Remove debris and litter from detention area to minimize clogging of the sand media.	Routine – depending on aesthetic requirements			
Landscaping removal and replacement	If the sand filter is covered with rock mulch, bluegrass, or other landscaping covers, the cover must be removed to allow access to the sand media. Replace landscaping cover after maintenance of sand media is complete.	Every 2 to 5 years.			
Scarify filter surface	Scarify the top 2 inches of sand on the surface of the filter.	This may be required once every two to five years depending on observed drain times.			
Sand filter removal	After scarification has been done two or three times, replenish the top few inches of the filter with clean coarse sand (AASHTO C-33 or CDOT Class C filter material) to the original elevation. Maintain a minimum sand depth of 12 inches. Eventually, the entire sand layer may require replacement.	If no construction activities take place in the tributary watershed, every 2 to 5 years depending on observed drain times, namely when it takes more than 24 hours to empty 3-foot deep pool; otherwise more often. Expect to clean out forebay every 1 to 5 years.			
Inspections	Inspect detention area to determine if the sand media is allowing acceptable infiltration.	Routine – biannual inspection of hydraulic performance, one after a significant rainfall.			

Adapted from Urban Drainage and Flood Control District, Vol. 3

# Constructed Wetlands Channel Inspection Checklist

Owner/Corporation \_\_\_\_\_  
 Date of Inspection \_\_\_\_\_  
 Inspection Performed by (w/signature) \_\_\_\_\_  
 Location of Facility \_\_\_\_\_

Required Action	Maintenance Objectives	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated
Lawn mowing and lawn care	Mow occasionally to limit unwanted vegetation. Maintain irrigated turf grass 2 to 4 inches tall and non-irrigated native turf grasses at 4 to 6 inches.	Routine – depending on aesthetic requirements.			
Debris and litter removal	Remove debris and litter from the entire channel to minimize outlet clogging and aesthetics. Include the removal of floatable material from the pond's surface.	Routine – including just before annual storm seasons (i.e. April and May) and following significant rainfall events.			
Erosion and sediment control	Regrade and revegetate eroded and slumped areas along channels. Repair damaged inlet and outlet energy dissipaters.	Nonroutine – periodic and repair as necessary based on inspection.			
Inspections	Inspect the channel for function as initially intended. Pay attention to outlet clogging. Also note erosion, slumping, sedimentation levels, overgrowth, embankment and spillway integrity, and damage to structural elements of the facility.	Routine – annual inspection of hydraulic and structural facilities. Biannual performance and maintenance inspections.			
Nuisance control	Address odor issues, insects, and overgrowth with appropriate measures.	Nonroutine – as necessary per inspection or local complaints.			

Adapted from Urban Drainage and Flood Control District, Vol. 3

# General BMP Inspection Checklist

Owner/Corporation \_\_\_\_\_

Date of Inspection \_\_\_\_\_

Inspection Performed by (w/signature) \_\_\_\_\_

Location of Facility \_\_\_\_\_

Required Action	Maintenance Objectives	Frequency of Action	Work Completed/Date	Overall Condition of Facility (properly functioning or not?)	Future Work Anticipated